

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-8 are pending in the present application with claim 5 having been amended by the present invention.

In the outstanding office action, claims 1-4 were withdrawn from further consideration by the Examiner; claim 5 was objected to; and claims 5-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over Hata et al. in view of Matsumoto et al.

Regarding the objection to claim 5, claim 5 has been amended to clarify that the transparent electrode is not activated due to an oxygen plasma. Accordingly, it is respectfully requested this objection be withdrawn.

Claims 5-8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hata et al. in view of Matsumoto et al. This rejection is respectfully traversed.

Amended independent claim 5 is directed to a light-emitting device including a double substrate; an n-semiconductor layer, an activated layer, and a p-semiconductor layer, formed in order, on top of the double substrate, wherein the p-semiconductor layer is heated at a temperature less than about 600 °C under a condition of an oxygen plasma ion; a transparent electrode for extending an electric current formed on the top of the p-semiconductor layer; a p-pad electrode formed on the top of the transparent electrode for extending an electric current; and an n-pad electrode formed on part of a mesa-cut section of the n-semiconductor layer for extending an electric current.

These features are supported at least by paragraphs [0021] and [0023] – [0027]. Thus, because the p-type semiconductor layer is activated using an oxygen plasma ion, it is possible to conduct a heat treatment process at a lower temperature compared to the conventional thermal temperature of 600°C, which increases the durability and efficiency of the light-emitting element (see paragraphs [0026] and [0034] in the present application, for example).

The office action recognizes Hata et al. fails to teach plasma activating the p-semiconductor layer and relies on Matsumoto et al. as teaching this feature and cites Figure 3. However, it is respectfully noted Matsumoto et al. specifically discloses in

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paragraph [0033] and [0034] "In this embodiment, since the nitride semiconductor layers are treated in the atmosphere containing active oxygen to form the oxide film thereon before the activating treatment, the surface of the p-type contact layer 29 is prevented from being deteriorated and also the carrier concentration of the p-type contact layer 29 is increased. After the activation of the p-type impurity, like the above-described fabrication method, the surface of the p-type contact layer 29 is treated with at least one of acid and alkali as needed, to remove the oxide film therefrom (see step 106 shown in FIG. 1)."

Thus, Matsumoto et al. need to form the oxide film on the surface of the p-type contact layer before the activating treatment, and then after the activating treatment, the oxide film is removed with one of acid and alkali. This differs from the present which does not need an oxide film. Further, Matsumoto et al. does not teach or suggest heating the p-semiconductor layer at a temperature less than about 600°C under a condition of oxygen plasma ion as claimed.

Accordingly, it is respectfully submitted independent claim 5 and each of the claims depending therefrom are allowable.

CONCLUSION



In view of the above amendment, applicant believes the pending application is in condition for allowance. In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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